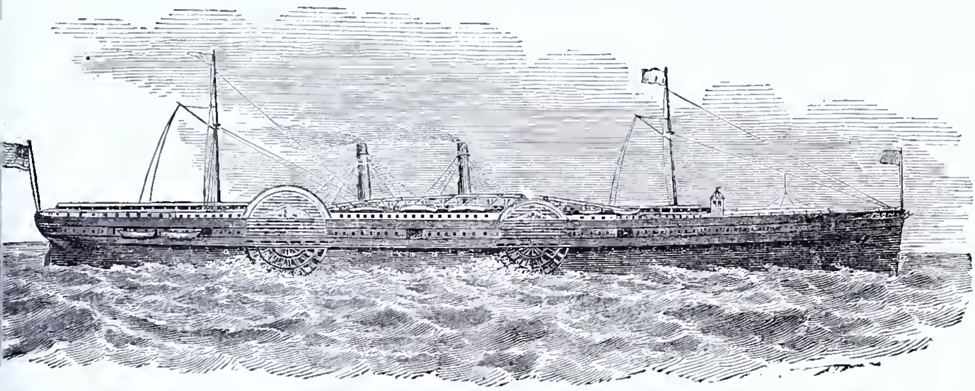
PROSPECTUS

OF THE

HILADELPHIA AND EUROPEAN

Steamship Company.

T PRESENT UNDER THE CHARTER OF THE PHILADELPHIA AND
CRESCENT NAVIGATION COMPANY.



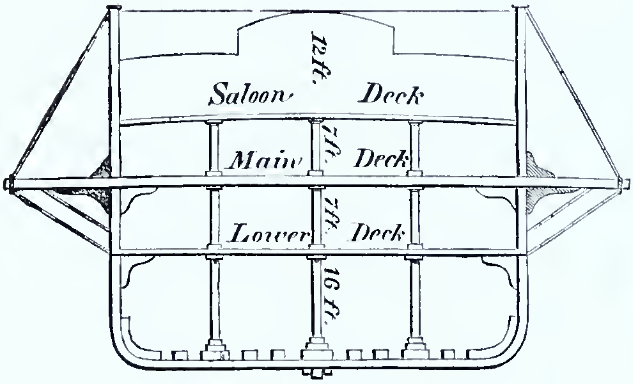
PHILADELPHIA:
JACKSON, PRINTER, 439 CHESTNUT STREET.
1859.

PHILADELPHIA AND E

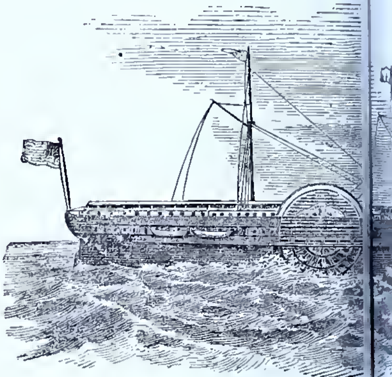
AT PRESENT UNDER THE CHARTER OF T

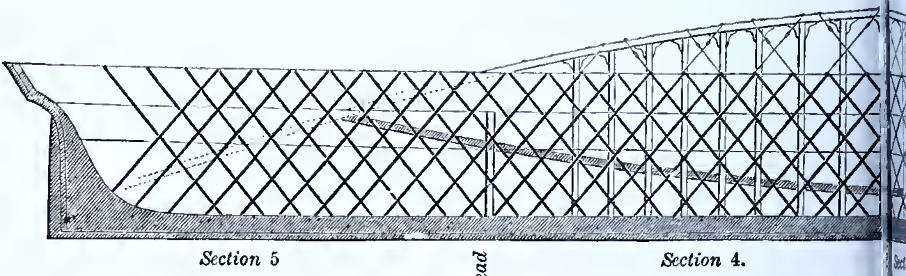
Showing Strengthening Arch

HENRY



Midship Section.





**480 Feet Keel,
58 Feet Beam.**

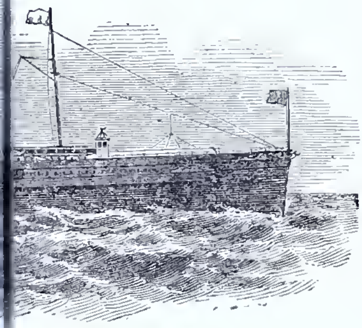
TEAMSHIP COMPANY,

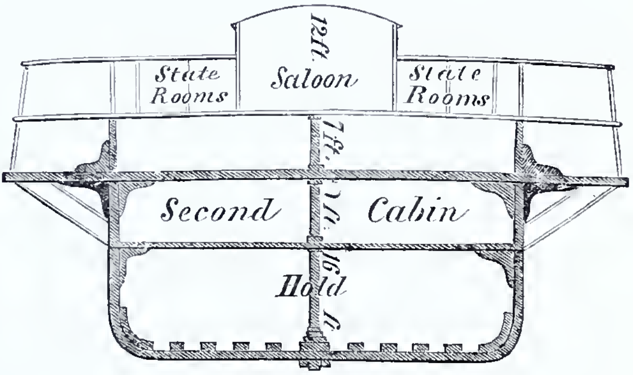
IA AND CRESCENT NAVIGATION COMPANY.

T,

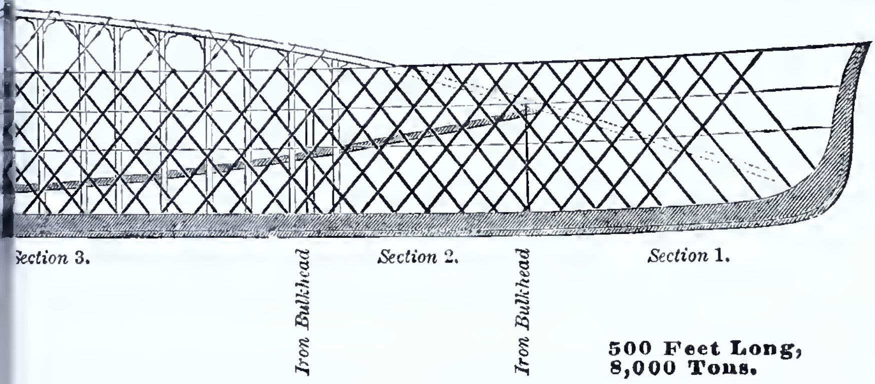
n with Iron Diagonal Braces.

rojector.





Midship Section.



500 Feet Long,
8,000 Tons.

Philadelphia and Crescent Navigation Co.

Present Capital, $500,000.

Shares, $500 each.

(At the next Session of the Legislature it is proposed to increase the Capital to $1,000,000, and to reduce the Shares to $250 each.)

DIRECTORS:

GEO. H. STUART,
MATHEW W. BALDWIN,
CHARLES MACALESTER,
J. EDGAR THOMSON,
S. MORRIS WALN.

Office of the Company, Nos. 128 & 130 South Delaware Avenue.

HENRY RANDALL,
Projector and Designer.

The first Ships built by this Company are to run between Philadelphia and Southampton. The Engines and Hulls are to be built in Philadelphia, under the immediate general direction of Captain Henry Randall, Projector and Designer of their Models, and from plans and drawings furnished by him and approved by the Directors.

Captain James West, late of the Adriatic, would take command of the first Steamship; assisting, also, in superintending its construction and outfit.

Introduction.

It is evident that, if the people of the United States are to sustain the character and supremacy of their Steamships for swiftness and passenger accommodation and safety, another class of vessels must supplant those at present employed on the different ocean routes. Our naval architecture must keep pace with the advancing spirit of the age, and the extraordinary enterprise which the commercial rivals of America are exhibiting in the different countries of Europe, but more particularly in Great Britain, whose government and mercantile men are using all the appliances of capital and science to obtain the control of all the lucrative lines of ocean travel. When the Great Eastern shall have made her first trip, steamers, heretofore regarded as first-class vessels, will be looked upon as pent-up floating prisons, especially fitted up for the prevention of all comfort during the voyage. Nothing can be more disagreeable to passengers than the present mode of stowing them away in small and ill-ventilated state-rooms. In this respect, a large and sweeping reform is required, and to accomplish it is one of the objects this company has in view. The vessels of this line will combine, with swiftness and security, all the comforts, and most of the luxuries to be found in first-class hotels.

Cheapness and uniformity of fare is another feature which will forcibly attract the attention of the traveling public, (and each shareholder will be entitled to a cabin passage one way, every year, for every $500 worth of stock,) and must insure the line the largest amount of patronage, not only in this country, but also in Europe. We have arrived at a point where improvement in steam navigation cannot remain stationary. As other nations progress, we must advance likewise or be forced to follow in their track, and consequently play a secondary and losing part. It is much more advantageous, and more in accordance with the principles of our republican institutions, and more in unison with our national and commercial interests, to place our vessels in the van of the ocean steam navies of the world; this can only be achieved by a first rate class of steamships such as this company propose to construct.

The increasing traffic, on the different California and European routes, renders such a line of vessels not only a convenience but a necessity. The shortening of the passages will secure an amount of goods and passenger returns which will, if no other consideration existed, render the line the best paying project which has yet been started in this country. The facilities afforded citizens of this country for visiting Europe must increase the amount of travel in that direction to a considerable extent. The frequent and sad disasters which have occurred to many ocean steamers have rendered an improvement in their construction absolutely essential to secure a paying passenger traffic. This is one of the principal recommendations of the proposed line.

By vessels of the proposed line, passages will be made in six or seven days, at most, which would be a saving of three days' time, a circumstance that would form a large money item in the mercantile transactions between Europe and America, while the British and American governments would be compelled to give the carriage of the mails to whatever line delivered them even one day earlier than by the present steamers. Whatever company first establishes the quickest steam communication between Europe and America, will secure a monopoly of the traffic, and obtain large pecuniary support on both sides of the water.

HENRY RANDALL.

Charter.

An Act to incorporate the Philadelphia and Crescent Navigation Company.

Section 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same,* That James C. Hand, John Trucks, A. Heaton, Edward C. Knight, Henry Simons, P. B. Savery, George J. Weaver, Daniel Haddock, junior, A. J. Buckner, Lewis Chester, George Martin, James S. Watson, Samuel C. Stokes, Charles H. Cummings, and their associates, and all persons who may associate themselves with them, and become now or hereafter may be holders of the stock hereinafter mentioned, shall be and they are hereby declared to be constituted a body politic or corporate, by the style of the Philadelphia and Crescent Navigation Company, to have perpetual succession, to be capable in law of suing and being sued in all courts whatsoever, to have a common seal, and to purchase, own, employ, charter, contract for building, equip, furnish and fit out all ships and other vessels, with their appurtenances proper for the propulsion and navigation thereof, to be sailed and navigated upon the Atlantic or other oceans, and upon all public navigable waters to or from any port in Pennsylvania, or from any port in the United States or elsewhere, to any port in the United States or elsewhere, for the purpose and object of carrying and transporting merchandise, and conveying passengers and mails by means of such ships and other vessels, and to hold and use all necessary rights and powers for loading and unloading, receiving and delivering merchandise transported or to be transported in said ships and other vessels, and the said ships or other vessels, or any of them or their appurtenances, or any part therof, when in the opinion of the directors of said company it may be proper so to do, to sell or dispose of; and further, to have all such other rights and powers as are or may be properly incident to a corporation having for its object the transportation of goods, wares and merchandise, and the conveyance of passengers and mails, by the means of ships and other vessels.

Section 2. That the capital stock of said corporation shall not exceed five hundred thousand dollars, divided into one thousand shares of five hundred dollars each; and that it shall be held as personal property, and as such be transferred under such regulations as the corporation shall judge convenient.

Section 3. That the office of the company shall be in the city of Philadelphia, in the State of Pennsylvania.

Section 4. That a general meeting of the corporators and stockholders shall be annually held on the first Monday of June, for the election of five directors, and the transaction of other business; but if such meeting or election shall not then take place, the corporation shall not for that cause be dissolved, but such meeting or election shall take place as soon thereafter as may be, two weeks' public notice thereof being first given in at least two daily newspapers in the city of Philadelphia for each and every corporate meeting or election.

Section 5. That the election of directors shall be by ballot from among the stockholders; and that in the enactment of by-laws for the government of the corporation and its officers, and in the decisions of all questions, the corporators present, either in person or by proxy, shall severally have one vote for each share of stock held by them.

Section 6. That the directors shall continue in office until their successors be elected, shall elect a president from among themselves, shall supply vacancies in their number, whether occasioned by death, resignation or refusal to act, and shall have the general and entire control of the affairs and interests of the company, except so far as may be otherwise provided by the corporators, and three members shall be a quorum

Section 7. That until other officers shall be duly elected, the persons named in the first section of this act shall be held to be directors of the said corporation, and shall have power and authority as such, and to receive subscriptions to the stock of said company, in such manner as they may direct and provide.

J. LAWRENCE GETZ,
Speaker of the House of Representatives.

DAVID TAGGART,
Speaker of the Senate.

Approved—The twenty-eighth day of April, Anno Domini one thousand eight hundred and fifty-seven.

JAS. POLLOCK.

PHILADELPHIA AND CRESCENT
Navigation Company.

Construction and complete equipment of one ship,......			$500,000
Crew list, per month, 128 men,..............................	$6,500		
Ship Stores per month,..	9,000		
Coaling Ship for the Round Voyage..........................	7,400		
Office Employees, Insurance, Port and Pilot Charges, Head Money, and all Incidental Expenses per Month and Voyage,..	20,000		
	42,900		
Multiplied by 12, the number of Round Voyages made in a year, gives a round total of........................			514,800
Cost of Constructing and Running one Ship for one year,			$1,014,800
ESTIMATE OF RECEIPTS FOR ROUND TRIP—			
Say 700 passengers to Europe:			
125 in 1st Cabin @$100 each,..........................	$12,500		
250 in 2d " @ 50 "	12,500		
325 in Steerage or 3d Cabin @ $25 each,............	8,125		
Freight on Treasure per Round Voyage,..................	4,000		
" Mail Matter " "	15,000		
Freight to Europe,..	10,000		
		$62,125	
Say 1000 passengers from Europe:			
200 in 1st Cabin @ $100 each,..........................	20,000		
300 in 2d " @ 50 "	15,000		
500 in Steerage or 3d Cabin @ $25 each,............	12,500		
Freight, &c., from Europe,...	20,000		
		67,500	
		129,625	
Multiplied by 12, the number of Round Voyages per annum, gives a round total of..........................			1.555,500
Bal. after paying Construction and Running Expenses,			$540,700

As a convincing proof that the above estimate is within bounds, we subjoin a list of passengers arriving at and leaving the port of New York, to and from Europe, in the following named vessels—

Ship Constellation	from	Liverpool	757
" Webster	"	"	745
" Manhattan	"	"	640
" Wm. Tapscott	"	"	720
" Dreadnought	"	"	528
" City of Brooklyn	"	"	378
Steamer Kangaroo	"	"	282
Ship Progress	from	Havre	504
" Mercury	"	"	331
" Neptune	"	Bremen	91
Barque Helvetia	"	"	160
Ship Plutarch	"	Antwerp	150
" Plymouth Rock	"	London	75
Total arrivals in one week			5,361

"DEPARTURES."

		Passengers.	Specie.
Steamer Vanderbilt	for Southampton	400	$1,400,000
" City of Baltimore	" Liverpool	270	400,000
" Edinburg	" Glasgow	125	
" Borussia	" Havre	231	60,000
Total Departures in one week [June, 1959.]		1,026	$1,860,000

Can any person, no matter how skeptical, doubt our being able to command the number of passengers estimated for, especially when they take into consideration that the ultimate destiny of nearly all this enormous amount of travel lies South, South-West, and West of the line of our own Central Road, and that, in addition to all this, we offer them better accommodations, greater security against accident, a great saving of time, and at a much lower rate of passage?

* * *

ESTIMATE OF RECEIPTS AND DISBURSEMENTS OF TWO SHIPS PER MONTH,

Making Monthly Trips between Philadelphia and San Francisco.

Say 500 passengers to Philadelphia—		
In 1st Cabin, 125 @ $150 each,	$18,750	
In 2d " 375 @ 50 "	18,750	$37,500
The same number from Philadelphia meet at Isthmus,		37,500
Freight on Treasure to Philadelphia from California,	20,000	
Express Mail to and from Philadelphia,	10,000	
" Freight from Philadelphia to California,	20,000	50,000
		125,000
Current Expenses per Month for Two Ships—		
Coaling both Ships,	30,000	
Wages of both Crews, 128 men each,	13,000	
Stores for both Ships,	10,000	
Office Employees and Incidental Expenses,	20,000	73,000
Net Earnings per Month for Two Ships,		52,000
Twelve Trips,		12
Net Earnings for one Year,		$624,000

To corroborate the above estimate, we subjoin a list of vessels arriving at San Francisco from Panama, with the number of their passengers—

Steamship Golden Gate	2018
" Golden Age	1940
" John L. Stevens	1834
" Sonora	1610

The Steamers arriving from Aspinwall at New York average about 600 passengers the year round.

Prospectus.

A Charter having been obtained under the constitution and laws of the state of Pennsylvania, by the name and style of the "Philadelphia and Crescent Navigation Company," with a capital stock of *Five Hundred Thousand Dollars*, divided into One Thousand Shares of Five Hundred Dollars each.

It is contemplated by the organization to establish a People's Line of first class Steamships on the Atlantic, for the transportation of passengers, freight, specie and mail matter, between Philadelphia and Europe, in connection with the great Pennsylvania Railroad and its tributaries, thus carrying out the original intention of the City Councils, in appropriating $5,000,000 to build the Central Road. The main line having been completed thus far, stops short of the idea with which our municipal legislature contributed so liberally, to create an unbroken line of communication between Europe and the granaries of the Mississippi Valley, *via* Philadelphia.

After a weekly communication is established between Philadelphia and Europe, it is the intention of the company to establish a line to California, whenever the *nett* profits of the European line shall warrant them in so doing.

Stockholders *will distinctly understand* that they *will not be assessed* anything beyond the *nett earnings* of the *first two ships built*, which will be amply sufficient to build the other ships as fast as the work can be judiciously done; thus leaving stockholders drawing *twenty per cent. yearly*, from their coupons attached to said Stock.

THE STEAMERS PROJECTED

will be five hundred feet long, and moulded fifty-eight feet beam, after the most perfect models, and embracing all recent improvements which add strength, security, speed and beauty to Ocean steamships; to be constructed with ample accommodations for 3,000 passengers, and 3,000 tons of freight. These ships will be modeled exactly after the steamship City of Buffalo. She is a regular 20 mile ship, with one pair of wheels. We get her exact lines, so as to make no mistake.

Model may be seen at the rooms of the Board of Trade, Philadelphia.

THEIR CONSTRUCTION.

The ships will embrace the improvement of *iron diagonal braces* around the frame, *iron bound*, inside the planking, and *iron bulk-heads*, dividing each ship into SEVEN WATER-TIGHT COMPARTMENTS, so that, in the event of injury from grounding or collision, THE HULL CANNOT

SINK. By the combination of these and other important features of safety and strength in these ships, such catastrophies as the "Arctic," "Pacific," "Yankee Blade," "*Central America*," "Winfield Scott," "Tennessee," "Austria" and others have met with, become ***next to impossible.***

THEIR MOTIVE POWER

will consist of *two marine engines*, with two sets of wheels (SEE ENGRAVING ANNEXED) constructed in such manner and located so as to obtain a vast increase of *speed*. It is confidently believed the passage between Philadelphia and Europe can be accomplished in seven days.

GREAT SAVING IN COAL.

The latest improvements in engines and boilers will be adopted, by which the consumption of fuel will be very materially lessened, effecting an important saving in this chief item of expense. The ships will coal at this port as the starting point of the route for the round voyage; thus dispensing with those immense coaling stations along the line and in foreign ports,—ruinous accessories to a Steamship Company, and a great hindrance to steam navigation. These steamers are constructed with ample fuel room, sufficient to run 8,000 miles without stopping for coal.

The accommodation for passengers will be commensurate and in keeping with the general enterprise. The ships are to be built precisely alike, thus insuring to the traveller the prominent advantage of *uniformity of accommodation on each vessel.*

THE ARRANGEMENT OF THE CABINS

will comprise three departments—main cabin or saloon, and second cabin, with an emigrant cabin entirely separate and distinct, with ample accommodations for 1,500 emigrants, at $25 per head. The main saloon will have 350 feet of uninterrupted length, and contain 175 family state-rooms (double beds in all) of extra size, and a dining and drawing-room, each 150 feet long. For the comfort and convenience of excursionists, who will be induced in consequence of the increased safety offered by these vessels, to visit Europe in preference to Saratoga, Newport, Niagara, &c., there will be found on board these ships a social hall, reading-room and library, 50 feet long, and a smoking-room, 45 feet in extent, and numerous baths, comparing favorably with first-class hotels. Meals to be served on the European plan, at all hours, day and night, with a number of similar luxuries hitherto unknown at sea.

A sky-light, with movable windows, will run *the entire length of the saloon*, and thus afford the most perfect method of regulating ventilation. The second cabin will be arranged with family rooms, also bath-rooms, and distinct apartments for ladies and children; and the entire plan will be upon a system of the most thorough neatness, proper ventilation, and ample room.

CAPACITY OF TONNAGE.

These ships have been arranged with special reference to the carrying of large amounts of merchandise, which, from their great size, (allowing the freight to occupy the space usually devoted to steerage passengers, within which at least two thousand tons can be safely stowed,) it is proposed to carry at *greatly reduced* rates.

MODELS AND PLANS

of these steamships have been drawn, and may be seen at the Office of the Company, Nos. 128 & 130 South Delaware Avenue, or at the Philadelphia Board of Trade.

SAFETY.

SEVEN WATER-TIGHT COMPARTMENTS.

They will fully exhibit the advantages arising from the independent working of the engines, which being entirely distinct, (130 feet apart,) will economise in coal at least 25 per cent. over the *double engines* now used on Collins' ships, and by which greater security is guaranteed against detention from a derangement of machinery, fire or a lee shore. Fire engines and steam pumps (thirteen in number,) *capable of throwing one hundred hogsheads per minute*, &c., always kept in readiness for use. One steamer will be built and placed on the European route *within nine months* from the time of their commencement.

INSURANCE.

Certificates from the best offices in New York and Philadelphia are in possession of the Company, and may be seen at their Office, indicating a willingness to insure the vessels at lower rates than any now afloat.

ESTABLISHED AND FIXED RATES OF PASSAGE

to Stockholders, and at the following rates, namely:

TO OR FROM PHILADELPHIA OR EUROPE.

First Cabin $100.   Second Cabin $50.
Emigrants $25.

TO OR FROM CALIFORNIA OR PHILADELPHIA.

First Cabin $150.   Second Cabin $50.

Thus, by the establishment of a fixed scale of prices, the traveler will avoid the disappointment and annoyance so often experienced by the fluctuating rates of passage, and at a cost comparatively small will be enabled to prosecute his journey upon a ship of unexampled size, *perfectly safe*, well ventilated, and having all the comforts of a first-class hotel.

It is ascertained that the Company can afford to carry passengers on ships of this class, at the estimated rates, and make all the money that can reasonably be asked for. Although the steamers will have accommodation for three thousand passengers, yet if they only average five hundred, they will net the Stockholders a fair return on their investment; quick time and great economy.

INDUCEMENTS TO TRAVEL.

It is a well established fact, that the better and safer the facilities, the greater will be the increase of travel. From the inducements offered by this Company, they may reasonably expect to average a much larger number of passengers than are estimated upon.

It is natural to shrink from crossing the seas in small, slow and crowded ships, and doubtless all have, to a greater or lesser degree, experienced difficulties in procuring comfortable accommodations upon the ships now in use, *especially* within the tropics. It is believed that a voyage from Philadelphia to California or Europe, performed on the ships of this line, if not actually a *pleasure trip*, will at least be far more comfortable than could be obtained upon any other line; while the facilities for the rapid transmission of treasure, freight, express and mail matter, are so far superior to all others as not to require further mention.

The advantages these steamers will possess over all others, are:

First—A much larger capacity for the same expense of sailing.

Second—A greater increase of speed with the same given quantity of fuel.

Third—Greater safety and security against detention.

Fourth—Superior accommodations to any Ocean Steamers ever built.

Fifth—These ships can be run at less expense than the old fashion 2,500 ton ships.

IDENTITY OF THIS ENTERPRISE WITH PHILADELPHIA INTERESTS.

In order to identify this enterprise more fully with the vital interests of the City, it is proposed to obtain as many Shareholders as possible from among, and to give the people of Philadelphia the first opportunity of securing the stock, the purchase of which will be merely the securing of their passage tickets in advance, and as an inducement to the taking of the same, the following right is extended, viz.:

To every certificate of stock of $250 is attached coupons or passage tickets of $50 each, each being good in payment for freight, or passage between Philadelphia and California, or between Philadelphia and Europe, yearly, as they become due, until the expiration of the coupons, (twelve to thirteen years;) said coupons or tickets can be remitted in lieu of drafts in payment to the Company. Every three shares of said stock shall in like manner entitle the bearer to a ONE FIRST CLASS TICKET FOR A PASSAGE between Philadelphia and San Francisco, and two shares to or from Europe on any ships of the Company, or said coupons will be received as $50 in payment for freight or passage, and being transferable, the bearer may use or sell the same at his option, thus enabling him to realize an immediate return of *twenty per cent.* upon the amount invested. These coupons will be received by the company as bank bills.

SUBSTITUTION OF THE SCRIP FOR PASSAGE TICKETS.

Shareholders will also have the right to surrender their stock to the Company at any time they please, and the Company will redeem the same in freight or passage at par.

ONE COMMON INTEREST.

It is a fundamental feature of the plan proposed, to embrace the ownership of the entire route *within one common interest*, and under the management of a President and Board of Directors, chosen by the Stockholders.

The advantages arising from such an organization, and the carrying out of the proposed plans, may be stated as follows:

1st. The stock being distributed among all classes and in all sections of the world, especially throughout the State of Pennsylvania, the line cannot be otherwise than popular, and the investment must consequently prove highly remunerative, (as all owners are agents.)

2d. The price of passage being fixed to stockholders, persons residing at a distance or at their homes, will know what it cost them as well as when they arrive at the office of the Company.

3d. The rate being low, all will have an opportunity to accompany, or send for their families, without using up the savings of years for passage-money. This will induce an increased emigration, and enable thousands to send for those they have left behind them.

4th. The ships are to be built precisely alike, insuring to travelers the prominent advantage of uniformity of accommodation on each ocean; thus, passengers being ticketed to parlor-room No 50, the same right extends to all the company's vessels.

5th. The steamers will possess *unparalleled accommodations*, will be of great *strength*, of *high speed*, entirely *safe*, and, so far as human foresight can devise, *secure against delay ;* for should one engine fail, the vessel will have another (with other wheels) ready to prosecute the voyage.

WHEN THE LINE IS COMPLETED.

That feature in the formation of the Company, which invites stockholders to travel on their own ships, might leave the impression that the steamers would be loaded each trip with owners. The following brief statement will show this view of the case to be erroneous. It is only proposed to issue stock at present to the amount of five hundred thousand dollars, in order to construct one steamer, one additional steamer to be provided for by increase of capital to one million dollars, and then the nett earnings of the two first ships over and above the 20 per cent. to build the remaining ships required to complete the line.

Five hundred thousand dollars, being two thousand shares, of two hundred and fifty dollars each, only two thousand coupons will be redeemable for this ship the first year ; it follows, therefore, that the ordinary or usual price of passage, equally distributed in first and second cabin, the whole number of coupons will not be equal to half the capacity of one of the steamers of the Company on any single passage, leaving the whole remaining twenty-three passages to be paid for in cash. The dead-head system, under the plan proposed, will be entirely obviated, as stockholders and all others will be required to pay their passage in either coupons or money. This Company makes no allowance on the 20 per cent. coupons in their nett profits that goes to pay agents, dividends, &c.

EXPLANATION.

Each ship will make twenty-four passages to and from Europe annually. Stock issued to build one ship, two thousand shares of $250 with twelve to thirteen $50 coupons attached to each share one to be redeemed annually as they fall due. Two thousand shares gives 1,000 cabin passengers to be carried yearly. Average for one ship per round voyage, 41$\frac{2}{3}$. Two ships making forty-eight passages 20 5-6, and four ships ninety-six passages, gives 10 5-12, only. When the line is complete from Europe to California via Philadelphia, requiring eight steamers, there will not be as many stockholders on each ship as the company will really desire to entertain as their traveling guests. Thus the stockholders will readily see that the nett cost to them will only be about $10 each for their passage across the ocean.

New York, *January 5th*, 1857.

H. Randall, Esq.

Dear Sir:—As requested, I have given your system of constructing and propelling steamers, for marine service, a thorough and careful study, and, as far as my ability extends, give you a true review of those points that have the most important bearing, and many of which can scarcely fail to assume a self-evident position in any judgment at all fitted, by study or experience, to analyze and appreciate "the workings in" and harmony, as a whole, of the system you advocate, and, I will hope, are soon to demonstrate.

There are very many points in your system (and some of them of the most important and desirable nature) that will be developed in its practical working only, and that are not evident to superficial examination. Convenience, durability, and precision in handling the ship (and especially in heavy weather) are readily perceived; but what is equally true, though less apparent, is that the plan of the two separate single engines, working independently, yet with an adjusted relation to each other, in the manner substantially as you propose, opens the door, not only to a large economy in first cost for a given motive power for the ship, but a great economy in fuel; taking as a criterion the best marine steamers leaving this port, and certainly equaling in this respect our river boats, to which in fact your style of hull, length of floor, and style of engines, are a close parallel, without reference to the advantages of duplicate engines adopted by you or to the peculiar framing and trussing, which cannot fail in my opinion to render your vessel more staunch and lasting for sea service than any system now in vogue.

In regard to your plan of double wheels, there is a matter involved vastly more important and promising of more important results than one would, I believe, credit at first glance. The forward wheels will do neither more nor less than ordinary duty, and the same may be said of the after ones, so far as the mere fact of their existence is concerned, but their virtue is due almost entirely to their very important location; this points to consequences scarcely to be over estimated, and I will endeavor to demonstrate this: As a vessel is driven forward (if modeled in accordance with the least resistance, as yours,) she parts or displaces the water like a wedge, and this may be resolved into lifting that weight of water from the depth of its main centre of gravity to her line of immersion in a time corresponding to that in which her widest immersed cross section will travel a distance reaching to her bow; here you have then the three elements necessary for the expression of the power "theoretically" exerted, viz.: the given weight raised a given distance in a given time. This power may be considered to be exerted and supplied through the usual engine and wheels of a steamer, represented by your forward engine and wheels; but now the maxim "action and reaction are equal" to some extent applies, if it does not fully, for this displaced water must close behind the ship, and since, even if she were *stationary*, the pressure of water against her stern only balances that on her bow, then it is evident that just in proportion to the *then static* pressure and inertia of the water on her bow, resists her moving forward; so must the water at her stern when under weigh, through its inertia, hold her back; because without considering its adhesion to her (which greatly exceeds in her power to retard,—the friction of the same water against her at the bow,) it will be seen that she tends to leave a vacuum after her which is prevented only by the gravity of the water and the pressure of the atmosphere, closing it in behind her; but which effect, that very gravity (inertia,) retards. And further, it will be seen that whilst the forces thus preventing the actual formation of such vacuum remain a constant quantity, the tendency to form it increases in an enormous ratio with the speed, thus becoming a more and more serious drawback to the attainment of each addition to the latter.

If this vacuum were supposed to be really produced for a moment, the resistance to her progress would be equal to a pressure of 15 pounds per square inch on the area of her immersed cross section, which would hold her as a rock; but as the inertia of the water behind her stern, would be vastly less than this, as also much less than her own momentum, the water is pressed in towards *her*, as before explained, all of which is resolvable into the *fact* that here exists a retarding power equal in amount to a power capable of moving such quantity of water from a state of rest to a speed equal to that of the vessel, in a time equal to that in which she passes through a distance corresponding to that from her greatest immersed cross section to her stern.

Since, however, a vessel does not absolutely produce even a partial vacuum in passing through the water, but only *tends* to do so, this source of retardation may seem far-fetched and insignificant, and so perhaps it might be an insignificant speed of the vessel, but as will be seen, after a moment's reflection, it increases in a tremendous ratio with the speed, as before remarked. Practice proves its great consequence, for we all know that no amount of steam or sail can give speed to a craft with a square stern and a short "run."

Now here is where your after paddles tell to a great advantage. They take the water just where it is coming to rest from the impulse it has received from the forward wheels, and where it is about commencing to adhere to, and in a sense drag after the ship; in other words, commences to be dead water, or water which leaves or parts from the vessel with far *less* velocity than *she* advances, she *towing* it the difference.

Thus, these paddles, on the one hand, not only have a firm dip, in comparatively smooth water, not running away from them, but on the other hand, they give this water a fresh impetus, carrying it quickly in, under and beyond the curve of her run; closing her in with "live" water, and greatly relieving her from the adhesion and "drag" referred to. With regard to the style of engines, and also the style of boilers, you propose to adopt, I believe you will not find among practical engineers, a dissenting voice as to the excellence of your choice for economy of fuel, speed and durability; and their arrangement is most happy for balance and compactness in the ship.

I trust you are aware that very many of these points of excellence which you have combined in one ship, have some time since been appreciated by engineers—but those who *pay* for ships, set their *copy*, which we have no choice in the main but to follow.

Yours, with high respect,

WM. MONT. STORM,
Engineer,
168 SECOND AVENUE, NEW YORK.

BUFFALO, N. Y., Oct. 10, 1859.

H. RANDALL, Esq.,

SIR:—I have carefully examined the opinions given by Wm. Mont. Storm, Engineer, in regard to your plan of building Steamships, &c., and I have no hesitancy in fully concurring with him in all his views.

As to the plan of Engines you propose, I have used them for many years, and find them to be the best, safest, and most economical engine used for sea-going vessels. The plan for Boilers you propose to adopt, I have seen in use, and consider them the best ever used, both for economy of fuel and the generating of steam.

It was my good fortune, during the past season, to take a trip on Lake Erie, on board the steamer "City of Buffalo," (which model you build after,) and I must say that she is the most beautiful model and fastest running boat (in my opinion) in the world, having averaged twenty-two miles per hour. She was built in 1857, by J. W. Banta, Esq. This steamer is 340 feet long, and measures about 2,500 tons, and is perfection in all respects.

As it regards an experiment, as some have asserted your plan of steamship, engine and boilers to be, I deny that it is such. The whole of your plans are a practical matter of fact.

Very respectfully yours,

WALTER CAMPBELL,
Late Engineer Steamship Washington.

Jersey City, *December* 11*th*, 1857.

Sir:—Your mode of strengthening Steamships, proposed to be constructed for the California service, I think the best I have ever seen, and I believe such ships entirely suited for sea service, can be built with less cost and greater strength than in any other manner, if your plan is fully carried out. As regards the model and general arrangements of the ships, they appear to me to be perfect.

The plan of using two engines each, with their own wheels, in separate compartments of the ship, I think excellent, and can see many advantages thereby, such as less liability to break down, than where engines are connected; a greater control over the ship than with one set of wheels, and the power, being in separate and distinct compartments, greater safety is thereby gained by having the pumps and fire appurtenances so far apart, as to control leaks, or fire, that could not be done by a concentrated power. There are many considerations involved in the construction of Steamships for ocean service, where so large an amount of human life is constantly at stake, it is only those who are familiar with its details who are competent to decide upon its merits, and so far as my knowledge goes, I believe you have carefully considered the subject and will undoubtedly produce ships that will be a credit to yourself and the world.

Very truly, yours,

J. J. COMSTOCK,
Steamship "Baltic."

Capt. Henry Randall,
St. Nicholas Hotel, *New York*.

Office of the Board of Marine Surveyors and Inspectors,
Philadelphia, *June* 14*th*, 1859.

Capt. Henry Randall, Sir:

We, the undersigned Surveyors and Inspectors for the Philadelphia Board of Marine Underwriters, after a careful examination of the model and mode of construction submitted to our inspection of a four wheeled steam ship you propose building, to run between Philadelphia and Europe, take great pleasure in expressing our entire approbation of the same, and are fully of the opinion that you have succeeded in combining the greatest amount of strength, safety, and speed yet attained in the construction of an ocean steamship.

Your method of strengthening the hull by solid arch on each side the ship, together with the vertical arch and iron diagonal bracing, extending over the whole frame, is productive of a combination of strength and security we have never seen equalled.

We also notice that in addition to the increase of speed to be obtained by the second or after pair of wheels, their great importance in preventing collisions when running at night or in thick or foggy weather, as by keeping them in readiness to back instantly on the first approach of danger under such circumstances, the loss of life and property heretofore prevalent to such a fearful extent might be almost certainly avoided, or without doubt the liability to such disaster greatly diminished.

Your intention of subdividing the hold of the vessel into water tight compartments, must add largely to her safety, and in our judgment no steam vessel for ocean service should be without them.

With our best wishes for the entire success of your enterprise,

We are, Sir, yours respectfully,

C. GULAGER,
JOHN GALLAGHER,
ENOCH TURLEY,
THOMAS G. MUNROE,
TIMO. ROGERS.

PHILAD., *June* 16*th*, 1859.

CAPT. HENRY RANDALL,

Sir—The want of success in steamship enterprises, both in New York and Philadelphia, has been principally owing to the great draught of water and too small capacity of the ships. The consequence of the draught is a powerful and expensive engine, with its army of greasers, firemen, and coal passers, and, more than all, an immense consumption of fuel in order to attain an average rate of speed, literally constructing a vessel whose whole carrying capacity has been employed as a huge coal-bunker, submerging her paddles too much at the commencement of the voyage, and raising them too much out of the water at the termination of it.

Your plans for constructing an ocean steamer, as we understand them, combine the difficult but not impossible qualities necessary for speed, strength, and a light draught, without being overloaded with power. Having tested them in the construction of several steamers in Cuba, for passengers and freight, we speak, not merely our opinion, but from certain knowledge. They have been pre-eminently successful in carrying out the purpose for which they were built,—a light draught, great capacity, and superior speed.

Respectfully yours,

CRAMP & SONS,
Ship Builders.